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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,986	12/24/2003	Akihiro Mochizuki	350292001900	3442

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/766,986

Applicant(s)

MOCHIZUKI ET AL.

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 and 31-33 is/are pending in the application.
- 4a) Of the above claim(s) 8-29 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Response to Arguments

2. Applicant's arguments filed 20 November 2006 have been fully considered but they are not persuasive.

The applicant argues that the references do not show the recited feature that the liquid crystal shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage. This is not persuasive. Both *Takatori* and *Tanaka* explicitly states that there is no, or almost no, spontaneous polarization, due to the anti-ferroelectric ordering which occurs in the liquid crystal. The claim language therefore does not patentably distinguish over the applied references, and the previous rejections are maintained.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by *Takatori et al.*, U.S. Patent No. 6,040,889.

Takatori discloses [see Fig. 5], a liquid crystal display device comprising at least a pair of substrate [1, 2], and a liquid crystal material disposed between the substrates, wherein the molecular initial alignment [conducted by rubbing shown in Fig. 15A] in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material, and the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage [col. 4, lines 36-46].

Claims 1 and 3 are therefore anticipated.

Takatori also discloses [col. 9, lines 42-44, Fig. 12] that an antiferroelectric liquid crystal exhibiting a phase transition behavior and having a SmC_A^* phase (ferroelectric property) was injected in the liquid crystal cell, so claim 2 is also anticipated. *Takatori* also discloses that the liquid molecular alignment treatment for the liquid crystal material is conducted in conjunction with a liquid crystal molecular alignment material providing a low surface pre-tilt angle of less than 1.5 degrees [col. 9, lines 14-29], so claims 4 and 5 are also anticipated. It is clear from Fig. 5 of *Takatori* that the liquid crystal material shows a bookshelf structure or quasi-bookshelf structure at the ferroelectric liquid crystal phase (SmC_A^*), so claim 6 is also anticipated. *Takatori* also discloses [see Fig. 15A] an extinction angle under the absence of an externally applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicol relationship, so claim 32 is also anticipated. Considering claim 33, the

recited limitation is merely an experimental result of the lack of spontaneous polarization [see pp. 23-24 of the specification]; since *Takatori* has no spontaneous polarization, it will inherently satisfy the limitation that a current passing through the pair of substrates shows substantially no peak-shaped current, when a continuously and linearly changing voltage wave form is applied, so claim 33 is also anticipated.

5. Claims 1-3, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by *Tanaka et al.*, U.S. Patent No. 5,847,799.

Tanaka discloses [see Figs. 1-6], a liquid crystal display device comprising at least a pair of substrate [11, 12], and a liquid crystal material [21] disposed between the substrates, wherein the molecular initial alignment [conducted by rubbing, col. 10, lines 14-20] in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material [col. 4, lines 39-45], and the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage [col. 12, lines 36-67]. Claims 1 and 3 are therefore anticipated.

Tanaka also discloses [col. 10, lines 31-34] that the liquid crystal material can show a ferroelectric property, so claim 2 is also anticipated. *Tanaka* also discloses [see Fig.3 and the corresponding text] an extinction angle under the absence of an externally applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicol relationship, so claim 32 is also anticipated. Considering claim 33, the recited limitation is merely an experimental result of the lack of spontaneous polarization [see pp. 23-24 of the specification]; since

Tanaka has no spontaneous polarization, it will inherently satisfy the limitation that a current passing through the pair of substrates shows substantially no peak-shaped current, when a continuously and linearly changing voltage wave form is applied, so claim 33 is also anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Takatori et al.*, U.S. Patent No. 6,040,889 in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Takatori differs from the claimed invention because it does not explicitly disclose that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device.

Kitayama discloses an LC device where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low

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temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claim 7 is unpatentable as well.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.*, U.S. Patent No. 5,847,799 in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Tanaka differs from the claimed invention because it does not explicitly disclose that the liquid crystal material shows a bookshelf or quasi-bookshelf structure and that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device.

Kitayama discloses an LC device wherein the LC material shows a bookshelf or quasi-bookshelf layer structure and where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a bookshelf or quasi-bookshelf structure and to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claims 6 and 7 are unpatentable as well.

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9. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.*, U.S. Patent No. 5,847,799 in view of *Takatori et al.*, U.S. Patent No. 6,040,889.

Tanaka differs from the claimed invention because it does not explicitly disclose that the liquid crystal molecules provide a surface pre-tilt angle of 1.5 degrees or less.

Takatori discloses a liquid crystal display device wherein the liquid crystal molecules provide a surface pre-tilt angle of 1.5 degrees or less [col. 9, lines 14-29]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a surface pretilt of 1.5 degrees or less to obtain a display device that enables continuous gray-scale display, facilitates orientation of liquid crystal, and moreover, provides a wide viewing angle [col. 3, lines 30-34]. Claims 4 and 5 are therefore unpatentable.

Election/Restrictions

10. Claims 8-29 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 30 June 2005.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

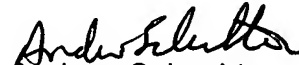
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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20 February 2007